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WHAT IS CLAIMED IS:

1 1. A semiconductor light emitting device
2 comprising a single-crystal silicon substrate, an
3 insulating layer formed on the single-crystal silicon
4 substrate, and gallium nitride type compound semiconductor
5 layers stacked on the insulating layer.

1 2. The semiconductor light emitting device of
2 Claim 1, wherein the single-crystal silicon substrate has
3 a (111) crystal plane as a principal plane.

1 3. The semiconductor light emitting device of
2 Claim 1, wherein the insulating layer is made of at least
3 one of silicon nitride and aluminum oxide.

1 4. The semiconductor light emitting device of
2 Claim 1, wherein the gallium nitride type compound
3 semiconductor layers are a plurality of layers including a
4 p-type layer and an n-type layer and having an active
5 layer for emission of light.

1 5. The semiconductor light emitting device of
2 Claim 4, wherein the gallium nitride compound
3 semiconductor layers comprises a buffer layer, a lower
4 cladding layer, an active layer, an upper cladding layer,
5 and a cap layer.

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1 6. The semiconductor light emitting device of
2 Claim 5, wherein the buffer layer is made of n-type GaN,
3 the lower cladding layer is made of n-type $\text{Al}_x\text{Ga}_{1-x}\text{N}$
4 ($0 < x < 1$), the active layer is made of $\text{Ga}_n\text{In}_{1-n}\text{N}$ ($0 < n \leq 1$),
5 the upper cladding layer is made of p-type $\text{Al}_x\text{Ga}_{1-x}\text{N}$
6 ($0 < x < 1$), and the cap layer is made of p-type GaN.

1 7. A method for producing a semiconductor light
2 emitting device comprising the steps of:

3 (a) forming an insulating layer on a single-
4 crystal silicon substrate;

5 (b) forming a gallium nitride type compound
6 semiconductor layer as a buffer layer on the insulating
7 layer;

8 (c) stacking on the buffer layer in sequence a
9 lower cladding layer, an active layer, an upper cladding
10 layer, and a cap layer, these layers being made of the
11 gallium nitride type compound semiconductor;

12 (d) exposing a predetermined surface of the
13 buffer layer by etching perpendicularly to the single-
14 crystal silicon substrate;

15 (e) forming electrodes on both the cap layer and
16 the predetermined surface of the buffer layer exposed by
17 the etching treatment in step (d), whereby obtaining a
18 semiconductor wafer having multilayer structure; and

19 (f) separating the semiconductor wafer to chips
20 by dicing or by cleaving.

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1 8. The method for producing the semiconductor
2 light emitting device of Claim 7, wherein the single-
3 crystal silicon substrate has a (111) crystal plane as a
4 principal plane.

1 9. The method for producing the semiconductor
2 light emitting device of Claim 7, wherein the step of
3 forming the insulating layer is implemented by removing an
4 oxide film over the single-crystal silicon substrate and
5 forming a silicon nitride layer by heating under an
6 atmosphere of nitrogen gas.

1 10. The method for producing the semiconductor
2 light emitting device of Claim 7, wherein the step of
3 forming the insulating layer is implemented by growing a
4 layer of aluminum oxide.

1 11. A semiconductor light emitting device
2 comprising gallium nitride type compound semiconductor
3 layers stacked on a gallium nitride type compound
4 semiconductor substrate.

1 12. A method for producing a semiconductor light
2 emitting device comprising the steps of:

3 (g) growing a gallium nitride type compound
4 semiconductor layer on a single-crystal semiconductor
5 substrate;

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6 (h) removing the single-crystal semiconductor
7 substrate; and

8 (i) growing single-crystal gallium nitride type
9 compound semiconductor layers including at least both an
10 n-type layer and a p-type layer, on the single-crystal
11 gallium nitride type compound semiconductor layer, with
12 utilizing the gallium nitride type compound semiconductor
13 layer as a new substrate.

1 13. The method for producing the semiconductor
2 light emitting device of Claim 12, wherein the single-
3 crystal semiconductor substrate is made of at least one
4 member of selected from the group consisting of gallium
5 arsenide, gallium phosphide, indium phosphide, and
6 silicon, and has a (111) crystal plane.

1 14. The method for producing the semiconductor
2 light emitting device of Claim 12, wherein the step (g) of
3 growing the gallium nitride type compound semiconductor
4 layer on the single-crystal semiconductor substrate is
5 implemented by forming a low-temperature buffer layer of
6 the gallium nitride type compound semiconductor on the
7 single-crystal semiconductor substrate at low temperature
8 of 400°C to 700°C and growing the gallium nitride type
9 compound semiconductor layer at higher temperature of
10 700°C to 1200°C.

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1 15. The method for producing the semiconductor
2 light emitting device of Claim 12, wherein before the step
3 (i) of growing the single-crystal gallium nitride type
4 compound semiconductor layers, a low-temperature buffer
5 layer of a gallium nitride type compound semiconductor is
6 grown at low temperature of 400°C to 700°C and then, a
7 high-temperature buffer layer of the gallium nitride type
8 compound semiconductor is grown at high temperature of
9 700°C to 1200°C and is followed by the growing of the
10 single-crystal gallium nitride type compound semiconductor
11 layers.

1 16. The method for producing the semiconductor
2 light emitting device of Claim 15, wherein the
3 single-crystal gallium nitride type compound semiconductor
4 layers including at least both an n-type layer and a
5 p-type layer comprise an n-type cladding layer, an active
6 layer, and a p-type cladding layer, these layers forming a
7 sandwich structure, the band gap energy of the active
8 layer being smaller than that of the n-type cladding layer
9 or p-type cladding layer, and the n-type cladding layer,
10 p-type cladding layer and high-temperature buffer layer
11 and the gallium nitride type compound semiconductor
12 substrate being the same in chemical composition.

1 17. The method for producing the semiconductor
2 light emitting device of Claim 12, wherein a semiconductor

3 wafer on which the single-crystal gallium nitride type
4 compound semiconductor layers are formed is cleft to
5 chips.

1 18. A semiconductor light emitting device
2 comprising gallium nitride type compound semiconductor
3 layers stacked on a group II-VI compound semiconductor
4 substrate.

1 19. The semiconductor light emitting device of
2 Claim 18, wherein the gallium nitride type compound
3 semiconductor layers are stacked on the substrate having a
4 principal plane, the principal plane being a top surface
5 comprising group VI atoms of the group II-VI compound
6 semiconductor substrate.

1 20. The semiconductor light emitting device of
2 Claim 18, wherein the semiconductor substrate of the group
3 II-VI compound material is made of at least one of zinc
4 selenide and zinc sulfide.

1 21. The semiconductor light emitting device of
2 Claim 18, wherein the gallium nitride type compound
3 semiconductor layers are a plurality of layers including a
4 p-type layer and an n-type layer and having an active
5 layer for emission of light.

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1 22. The semiconductor light emitting device of
2 Claim 18, wherein the gallium nitride type compound
3 semiconductor layers comprises a buffer layer, a lower
4 cladding layer, an active layer, an upper cladding layer,
5 and a cap layer.

1 23. The semiconductor light emitting device of
2 Claim 22, wherein the buffer layer is made of n-type GaN,
3 the lower cladding layer is made of n-type $\text{Al}_x\text{Ga}_{1-x}\text{N}$
4 ($0 < x < 1$), the active layer is made of $\text{Ga}_n\text{In}_{1-n}\text{N}$ ($0 < n \leq 1$),
5 the upper cladding layer is made of p-type $\text{Al}_x\text{Ga}_{1-x}\text{N}$
6 ($0 < x < 1$), and the cap layer is made of p-type GaN.

1 24. A method for producing a semiconductor light
2 emitting device comprising the steps of:

3 (j) preparing a group II-VI compound
4 semiconductor substrate;

5 (k) stacking a buffer layer of gallium nitride
6 type compound semiconductor on a principal plane of the
7 group II-VI compound semiconductor substrate;

8 (l) stacking on the buffer layer in sequence a
9 lower cladding layer, an active layer, an upper cladding
10 layer, and a cap layer, these layers being made of gallium
11 nitride semiconductor, with matching crystal lattice of
12 each layer to one another;

13 (m) forming electrodes on both the top of the cap
14 layer and the bottom of the group II-VI compound

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15 semiconductor substrate, whereby obtaining a semiconductor
16 wafer having multilayer structure; and
17 (n) cleaving the semiconductor wafer to chips.

1 25. The method for producing a semiconductor
2 light emitting device of Claim 24, wherein the step of
3 stacking the buffer layer is implemented by forming a low-
4 temperature buffer layer at low temperature and then, by
5 forming a high-temperature buffer layer at high
6 temperature.

1 26. The method for producing a semiconductor
2 light emitting device of Claim 24, wherein the buffer
3 layers are made of n-type GaN, the lower cladding layer is
4 made of n-type $\text{Al}_x\text{Ga}_{1-x}\text{N}$ ($0 < x < 1$), the active layer is made
5 of $\text{Ga}_n\text{In}_{1-n}\text{N}$ ($0 < n \leq 1$), the upper cladding layer is made of
6 p-type $\text{Al}_x\text{Ga}_{1-x}\text{N}$ ($0 < x < 1$), and the cap layer is made of
7 p-type GaN.

1 27. The method for producing a semiconductor
2 light emitting device of Claim 24, wherein the group II-VI
3 compound semiconductor substrate having a principal plane,
4 the principal plane being a top surface comprising group
5 VI atoms of the group III-V compound semiconductor
6 substrate, is prepared.

1 28. A semiconductor light emitting device

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2 comprising gallium nitride type compound semiconductor
3 layers stacked on a group III-V compound semiconductor
4 substrate.

1 29. The semiconductor light emitting device of
2 Claim 28, wherein the gallium nitride type compound
3 semiconductor layers are stacked on the group III-V
4 compound semiconductor substrate having a principal plane,
5 the principal plane being a top surface comprising group V
6 atoms of the group III-V compound semiconductor substrate,
7 is prepared.

1 30. The semiconductor light emitting device of
2 Claim 28, wherein the group III-V compound semiconductor
3 substrate is made of a member selected from the group
4 consisting of gallium arsenide, indium arsenide, gallium
5 phosphide and indium phosphide.

1 31. The semiconductor light emitting device of
2 Claim 28, wherein the gallium nitride type compound
3 semiconductor layers are a plurality of layers including a
4 p-type layer and an n-type layer and having an active
5 layer for emission of light.

1 32. The semiconductor light emitting device of
2 Claim 28, wherein the gallium nitride type compound
3 semiconductor layers comprises a buffer layer, a lower

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4 cladding layer, an active layer, an upper cladding layer,
5 and a cap layer.

1 33. The semiconductor light emitting device of
2 Claim 32, wherein the buffer layer is made of n-type
3 $\text{Ga}_w\text{In}_{1-w}\text{N}$ ($0 < w \leq 1$), the lower cladding layer is made of
4 n-type $\text{Al}_x\text{Ga}_{1-x}\text{N}$ ($0 \leq x < 1$), the active layer is made of
5 $\text{Ga}_n\text{In}_{1-n}\text{N}$ ($0 < n \leq 1$), the upper cladding layer is made of
6 p-type $\text{Al}_x\text{Ga}_{1-x}\text{N}$ ($0 < x < 1$), and the cap layer is made of
7 p-type GaN.

1 34. A method for producing a semiconductor light
2 emitting device comprising the steps of:

3 (o) preparing a group III-V compound
4 semiconductor substrate;

5 (p) stacking a buffer layer of gallium nitride
6 type compound semiconductor on a principal plane of the
7 group III-V compound semiconductor substrate;

8 (q) stacking on the buffer layers in sequence a
9 lower cladding layer, an active layer, an upper cladding
10 layer, and a cap layer, these layers being made of gallium
11 nitride type semiconductor, with matching crystal lattice
12 of each layer to one another;

13 (r) forming electrodes on both the top of the cap
14 layer and the bottom of the group III-V compound
15 semiconductor substrate, whereby obtaining a semiconductor
16 wafer having multilayer structure; and

17 (s) cleaving the semiconductor wafer to chips.

1 35. The method for producing semiconductor light
2 emitting device of Claim 34, wherein the step of forming
3 the buffer layers is implemented by forming a low-
4 temperature buffer layer at low temperature and then, by
5 forming a high-temperature buffer layer at high
6 temperature.

36. The method for producing the semiconductor light emitting device of Claim 34, wherein the buffer layers are made of n-type $\text{Ga}_w\text{In}_{1-w}\text{N}$ ($0 < w \leq 1$), the lower cladding layer is made of n-type $\text{Al}_x\text{Ga}_{1-x}\text{N}$ ($0 \leq x < 1$), the active layer is made of $\text{Ga}_n\text{In}_{1-n}\text{N}$ ($0 < n \leq 1$), the upper cladding layer is made of p-type $\text{Al}_x\text{Ga}_{1-x}\text{N}$ ($0 \leq x < 1$), and the cap layer is made of p-type GaN .

1 37. The method for producing the semiconductor
2 light emitting device of Claim 34, wherein the group III-V
3 compound semiconductor substrate having a principal plane,
4 the principal plane being a top surface comprising group V
5 atoms of the group III-V compound semiconductor substrate,
6 is prepared.